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ABSTRACT

The TADPOLE (Tech Assessment and Development for the Preparation of Optimal Learning Environments) Research Project assessed areas of parental competence in setting up home learning environments for children from birth to three years of age. Six half-hour videotapes were made of each of 30 families in their homes. Two instruments, Parent "Q" and TADPOLE Observation Scale, were used by the investigators to compare parents' knowledge of child development with parents' interactions with their children. The comparison was made to determine significant parental competencies in providing optimal learning environments for normal and developmentally delayed children. (Author)

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Assessing Parental Competence in Home Settings

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Assessing Parental Competence in Home Settings

Need

Never in the annals of history has a nation been so aware of the needs of its children (deMause, 1974). Since the mid-1960s, studies which have focused on the educational aspect of children of lower socio-economic groups have progressed from a concern with "educational deficits" of these children to a concern for producing competent children in the 1970s (Frost & Kissinger, 1976). Early programs have concentrated upon improving children's intelligence quotients (DiLorenzo, 1968; Deutsch, 1976; Elkind, 1973; Gray & Klaus, 1970; Hines, 1971; Nimnicht, 1970; Bereiter & Engelmann, 1966; VanDeRiet, 1969; Weikart, 1970; Spicker, 1969), as awareness of the I.Q. as malleable and dynamic during the first few years of life was accepted (Hunt, 1961; Bloom, 1964). Researchers have evaluated the components for intellectual, social, emotional, and physical development that have been used within the programs--especially those for the three-to five-year-old. Though gains seemed to wipe out within several years following the involvement of the child in these educative processes, general agreement that the processes were able to produce change while they were ongoing was reached (Steele, 1974).

The most significant conclusion synthesized from the research of the sixties seemed to be that the family is the most effective means for eliciting and sustaining the development of the child (Bronfenbrenner, 1974; Moore, 1968). This is a difficult result for educators to face. In Coleman's (1966) monumental survey of the United States' educational system, he reached a similar conclusion--the school cannot make the

difference in the child's life that is made by the familial influences during the hours when the child has not been in formal schooling. We have come to the same evaluation of program impact upon the younger child as that assessed regarding the school-aged child--the home/family is the crucial factor..

A second conclusion has emerged during the early seventies. As important as the three-to-five age span is in the growth of a competent child, the first three years have even greater importance. White (1975) drew a convincing picture of children as having developed a social contract with the primary caregiver by age two:

> He has acquired most of the social skills that he will exhibit at the age of six. These include getting the attention of adults and holding on to it, sometimes in very subtle ways. They include using the adult as a resource to help deal with problems; expressing affection and hostility toward adults in a variety of ways; a budding capacity to direct the adult in various activities, and exhibiting fantasy behavior on an interpersonal level.

Schaefer (1970) reported finding low levels of intellectual functioning in disadvantaged children as early as three years of age. Moore (1968) concluded from analysis of longitudinal data a relationship between parent behavior with the child of two and one-half years and the child's intelligence test scores at three and eight years of age. Wachs, Uzgiris, and Hunt (1971) found differences in intellectual functioning between infants as early as seven months of age that might be relevant to deficiencies that appear at later ages:

> Though the authors hold to the position that environmental factors such as degree and nature of stimulation are most relevant to these early intellectual differences, this does not rule out an interaction with other variables. . . . Deficiencies in performance are appearing at a very early age indeed. . . .This may mean that such programs as Head Start may be getting to these 'high risk' children much later in life than they should be, perhaps three years too late (p. 308).

For the child who has or may have developmental delay, intervention in infancy may have even greater significance (Diamond, 1971; Freeman and Thompson, 1973).

Understanding the impact of family environments upon the child has become a major issue of the seventies. The question becomes "How can the family become even more involved with the child's total processes from birth onward?" (Freeberg & Payne, 1967) Of course, the family of whatever size and makeup is involved by some means with the infant or else it perishes. Parent, usually mother, involvement has been the critical focus in attempts to improve the infant's capabilities in a number of programs (Gray, 1971; Lambie et al., 1973; Lazer et al., 1970; Gordon, 1975; Levenstein, 1971; Leler et al., 1975; Badger, 1971). Parent activity with the child in each of these programs was based upon assumptions that parents influence the development of children, that some parents lack knowledge or skills in teaching, and that one can intervene in the home to change parental behavior and improve the level and achievement of children. Bronfenbrenner (1974) analyzed the effectiveness of early intervention programs. Substantial initial gains were

found in studies of interventions in both group and home-based settings. Results showed that when group intervention was discontinued the gains also ceased and the effects of the interventions seemed to regress. However, after home-based intervention programs were discontinued, gains continued to increase and were still recognizable three to four years later.

The goal of reaching maximum potential of the child appears to be dependent upon awareness, observation, and levels of interaction with the very young child by the members of the family (Baumrind, 1970; Becker, 1962). What impact such awareness, observation, and interaction has had upon hhe child is subsequently known when the child enters school--perhaps as early at the present time as three years of age (Bing, 1963). Since developmental delay does occur within the child's capacities to function optimally by three years of age (Bloom, 1964), the study of how to aid the parents and other family members in promoting the maximum development of the child during the years from birth to three is needed (Caldwell, 1973).

Several researchers have challenged that the most pressing issue in the field of child development is to analyze further the ecosystem of child and environment (Schaefer, 1974). Caldwell directed attention to the need "to understand better the impact on the child of currently existing natural environments" (Caldwell, 1973).

Some effort has been made to understand this impact of the child's ecosystem upon his levels of development early in life (Blank, 1964; Lewis & Wilson, 1972; Escalona, 1973). Yarrow (1975) studied six-month-old infants in their natural environment, their homes, in an

attempt to determine the relationships between various "dimensions of the environment" upon the infants' "social, cognitive, motor, and motivational characteristics." Lytton (1976) concentrated upon the ecological socialization of two-year-old males, and called for additional studies that would name consistently specific "Parent-Child" interactions. Collis and Schaffer (1975) focused upon the interaction processes of infants/mothers/infants visualization patterns, and pointed out the necessity for observational techniques that would record such rapid and minute interactions in order to understand the impact of early learning environments. Laosa (1976) concluded that interaction patterns of Mexican-American and Anglo mothers with their children were distinctly different--more dependent upon cultural factors than upon language discontinuities.

Problem

Because of the need for study of children under three years of age in their natural environments (Yarrow, 1975; Caldwell, 1968), in 1974 three investigators* decided to pursue the possibilities within a research project entitled, Tech Assessment and Development for the Preparation of Optimal Learning Environments (TADPOLE).

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* Members of the faculty at Texas Tech University, Lubbock, Texas--Connie Steele & Betty Wagner, both in the area of Child Development, Dept. of Home & Family Life, College of Home Economics; and Sue Kiniry, in the area of Special Education, College of Education (now a faculty member at North Texas University, Denton, Texas).

The geographic area offered a unique population living in the Southwest United States. Most of the parent-infant interaction studies as well as intervention programs (Schaefer, 1971; Painter, 1969; Gordon, 1970; Levenstein, 1970; Karnes, 1970; Lambie, Bond, Weikart, 1973; Forrester et al., 1971) have been developed and conducted in the northern and eastern, predominantly urban, sectors of the United States (Wagner, 1975). Cole and Bruner (1971) emphasized the need for determining competence of a cultural group according to the situational context. We asked, "Will a family-oriented program developed in urban areas of the north and east using a Negro and Caucasian sample be effective and acceptable in a semi-rural, southwestern region, such as ours, where twenty percent of the population is Mexican-American?" We decided that in order to entertain the idea of developing appropriate programs for parent education in this region (Leler et al., 1975) our decisions should be based upon the collection of data from natural environments of Lubbock's population. Any subsequent program development could then be designed to accommodate itself to this region's ethnic patterns and values.

Collection of data of the child functioning in local environmental settings included the homes of three major ethnic groups--Anglo, Black, and Chicano (representing approximately 70%, 10%, and 20% of the population respectively). We wondered whether or not cultural differences existed within the homes that would make a difference in the child's learning proclivities by the time he/she reached three years of age. If no differences were evidenced, instructional strategies for use with parent programs and parent invovlement in local day care centers could be generalized according to the needs across cultural lines.

Secondly, we wanted to determine whether or not parents of developmentally delayed children exhibited significantly different levels of competence from those of parents of so-called "normal" children. Rutter (1970) suggested that mothers of mentally retarded children may have been shown to differ in their attitudes from the mothers of healthy children. The period between birth and three years of age provides an optimum time for change and improvement if physical, social, emotional, and/or intellectual difficulties are discovered or diagnosed in the child during that period. If either parents of "normal" children or parents of "delayed" children demonstrated techniques for rearing their children that were significantly exemplary, we reasoned that these models could be used in subsequent parent education programs regarding care of the child birth to three developmentally.

In the third place, the authors asked whether or not the age of the child to be studied related to parental competence. The conceptual approach that chronological age was only a concern in designating the child as either "normal" or "delayed" was assumed. Therefore, the "age" of the child developmentally allowed the competence of the sample parent population to be viewed at five developmental levels whether or not the parent's child was "normal" or "delayed":

TADPOLE Research Levels	Developmental Level
I	(a) birth to six months
II	(b) six to twelve months
III	(c) twelve to 18 months
IV	(d) 18 to 26 months
V	(e) 26 to 36 months

Sample

Number, Ethnicity, and Age Groupings

Thirty families were observed in home and other settings with one child in each family specified as having developmental age between birth and three years. Fifteen of the children were assessed to be functioning at the developmental level considered to be the norm for their chronological age, and fifteen of the families selected had children who were designated as functioning at levels indicating developmental delay in one or more aspects of growth. The sample included children with biological, medically identified syndromes as well as developmental delay that appeared to be due to environmental and familial interaction deficiencies. The pairs of normal-delayed infants were selected according to ethnic group, providing five pairs of young children from each of three ethnic groups. The five pairs were matched according to levels of development with one pair demonstrating abilities between birth to six months, six to twelve months, twelve to 18 months, 18 to 26 months, and 26 to 36 months. The TADPOLE sample is summarized below:

TADPOLE SAMPLE - N=30	NORMAL	DELAYED	TOTAL
ANGLO = 5 pairs	n = 5	n = 5	n = 10
BLACK = 5 pairs	n = 5	n = 5	n = 10
CHICANO = 5 pairs	n = 5	n = 5	n = 10
Total = 15 pairs	n = 15	n =15	n = 30

Socio-Economic Status

During recent years intervention programs have been provided for

children purported to be from low socio-economic status (SES) families. Usually the programs have been developed without detailed knowledge of the factors within the environments of these families. In order to obtain some clues regarding the environments of low SES families, TADPOLE made an effort to find families that would fit that designation as well as the other demographic characteristics outlined above.

We were unable to obtain a sample that could be classified as low SES according to a standard scale for classifying social and economic status of families such as the Hollingshead Index of Social Position (1956). Furthermore, we detected, as did Yarrow (1975) in his study of Negro infants, strong indications that father's educational and occupational levels were not a direct index of significant environmental conditions. Although not a part of this study, TADPOLE investigators concluded that the primary caregiver's expectations for self and child for filling of current and future needs were a much stronger force in the development of the child than financial, educational, or occupational levels.

In the TADPOLE sample of thirty families the primary caregiver was (a) the mother in twenty five families, (b) the father in no families, (c) the mother/father apparently equally in two families, and (d) the grandmother in three families.

The homes ranged from a sparsely furnished living room/bedroom/bath federally subsidized housing apartment occupied by fourteen persons to a moderately furnished, three-bedroom, single residence inhabited by mother/father and son and daughter. Though many homes were small, and meagerly furnished, some were extremely sub-standard in cleanliness,

while others were well-scrubbed, neatly arranged accommodations. Whatever the condition of the residence when first visited, it seemed to remain in similar condition throughout the videotapings.

Procedures

Method for Recording Observations

Of major concern was the selection of a method for recording and analyzing the parent-child interactions in natural situations (Yarrow, 1963). We were interested in capturing, if possible, the processes that might be both verbal and non-verbal, direct and indirect, changing and static during sequences of events. We rejected the possibility that interviews with family members would substantially reflect these dynamics. We selected observation in the home as our major methodology to be recorded by means of videotapings (Weikart, 1973). This method did have a number of disadvantages--not the least of which was its magnitude during the codings of thousands of feet of videotape . This problem was outweighed, however, by the fact that it reflected sequences of interacting behaviors as the camera panned from mother to child and back to mother or other family member involved in the event, suggested as one means for being able to draw inferences among variables (Cox, 1975; Freedman & Keller, 1963). Its use allowed the investigators and those making evaluations of parental competence to view and review the activities recorded on videotape again and again in order to verify one's own ar another's conclusions. Such a procedure is especially useful during the lack of overt activity or verbalizaion on the part of the very young child who has not yet acquired mobility or expressive language.

Furthermore, we became convinced that videotaping can be a reliable observation tool. In visiting the homes, at times unannounced, particularly when no telephone was within the home, we perceived the interaction patterns of the family members while "off camera." If these had seemed to be substantially different from what was subsequently observed "on camera," codings of behaviors would have been adjusted, but at no time was this the case. Finally, the family members viewed the videotapes after their being completed in order to be released for use in programs of various types; it also provided the family with assurance that the home, activities, language, and other interactions were "O.K." for public viewing of excerpts. Only one of the thirty families asked that any part of their tapes be deleted; we were unable to discern the reason for the deletion in that it involved momentary glimpses of a ten-year-old who had entered the room, and, from our point of view, did not constitute a critical variable; of course, this conclusion is a purely subjective one.

One other difficulty in using this methodology occurred. During the first ten to twenty minutes of the first of six to eight videotapes that were filmed of each family, some "observer presence" effects (Cox, 1975) could be noted, as the infant sat and stared, did not move about, did not talk or respond to other family members and/or as the primary caregiver (usually the mother) did not continue with what appeared to be her daily routines such as cleaning, cooking, talking on the telephone, or other usual activities. Such effects were more pronounced with the child in the third year and with the mothers who seemed to try to perform or to impress the investigators. For the most part,

however, we believe that the majority of the videotapes reflected an amazing degree of "naturalness" and activity that was representative of the household and its personnel.

A most important result of the use of videotape is the revealing of exemplary segments of parent/child/environment interaction for use in providing models to be excerpted for educational programs with parents, educators, students of early childhood, day care, and other personnel (Wagner, Steele, & Kiniry, 1976).

Situations Recorded

Direct and continuous observation through videotapings allowed the observer to make judgments about the quality of interactional variables that impressions and descriptions cannot provide (Escalona & Corman, 1974). However, the selection of when, what, and where to videotape posed subjective choice of what was important in the life processes of the child within the home situation. The investigators were interested in discovering the best processes used comfortably and routinely by the family to create a wide variety of learning situations--if, indeed, the patterns within the home created such opportunities. Each family was asked to proceed with its daily routines as nearly as possible. Entry to the home at varied hours was requested in order to record the involvement of child and family members in eating/feeding, bathing, toileting, play, management and guidance in usual and unexpected situations, as well as use of objects in the home at various times of the day such as television, newspapers and books, telephone, toys, and other household items. Each family was encouraged to indicate when TADPOLE personnel could arrive for these activities, but encouraged, too,

not to make any special arrangements for them--e.g. the investigators reassured the mother, "Dust doesn't show on videotape," while taping and showing her a five-minute sample of videotape of her and her home during the first visit.

Initial Contact with Prospective Families. The decision had been made to attempt the project with low SES families, but locating the families and gaining their trust at a level that would provide "natural situations" was difficult (Steele, Wagner, Kiniry, 1976). Furthermore, the difficulty was increased by the matched-pair, developmental level sample design. TADPOLE sought specific characteristics within the children of the sample--half normal/half delayed; one-third Anglo, one-third Black, one-third Chicano; one-fifth at a developmental level of birth to six months, one-fifth at a developmental level of six to twelve months, one-fifth at a developmental level of twelve to 18 months, one-fifth at a developmental level of 18 to 26 months, and one-fifth at a developmental level of 26 to 36 months.

Leaders from each of the ethnic communities were contacted and subsequently played key roles in establishing mutual trust between prospective families and TADPOLE personnel. Inclusion in the videotaping teams of university students of the same ethnic group as the cooperating family also aided in gaining entrance into the homes and the confidence of the families.

The initial contact with the family was crucial. The developmental age of the child was estimated during the first informal interview in order to determine whether or not that family would fit the research design. (Some families were videotaped--only to discern at the final

assessment taping that the child's "cell" had already been filled; this was an inconvenience, but those tapes will be utilized as part of a brimming data bank.) The objectives of the project were outlined to the family members, but the most appealing goal seemed to be that all members would be on "T.V."--since the tapes were shown the family on a small, portable monitor. (Each family was paid $10 at the end of their six to eight tapings, but they were not told at the outset that this small payment would be made; we hoped that parents would become involved because of interest in the experience rather than for the money, small as it was.)

Home Experiences

Three visits were made to each home to record through videotape multiple interactions of the child with family members and especially with the primary caregiver. Each visit usually required about two to three hours for carrying out several procedures: conversation for building rapport and a natural quality, setting up of equipment--the portable videotape and lighting, movement from one room to another to follow the child and/or primary caretaker during daily routines for the completion of a thirty-minute videotape, and the replay of the videotape for the family members. The time schedules for the three visits per family were not consistently followed; obviously hours for eating, bathing, toileting, playing and other interactions varied from family to family. Each family had a different schedule, and we met requests for certain hours, ranging from 7 A.M. to 9 P.M..

Structured Experiences in a Natural Setting

Upon the completion of the observations in the home, the infant

and primary caregiver were brought to a studio furnished minimally like many other small living rooms. In all cases, neither the infant nor the caregiver had seen the studio previously. The studio was prepared consistently in advance with common materials--a full-length mirror, a "potty chair", a high chair; a crib which could be converted to a play pen upon request by the primary caregiver; old magazines; some children's books, a purse filled with sunglasses, an unfilled lipstick case, a billfold with two pennies, Kleenex, a comb, and a cosmetic case; a metal-backed mirror, an infant-sized doll fully clothed; an upholstered chair with end table; a kitchen table with two straight-backed chairs; a child-sized table with two infant-sized chairs; and a washable rug on the floor.

The infant and primary caregiver were greeted at the door while being videotaped during entry into the studio. The environment was equipped as outlined above in order to determine how both caregiver and child adjusted to the use of the items or interacted in other ways within an environment that would be similar for the thirty TADPOLE infants and caregivers. Other family members were allowed to come with the selected adult/child if they wished to do so, or, more frequently, because they were siblings who had no one else with whom to stay during this observation. In this respect the structured environment became somewhat different for those families.

Two or sometimes three thirty-minute videotapes were made of so-called structured experiences. As part of these tapes, the primary caretaker was asked to select toys or items from three categories: (a) homemade or household items; (b) purchased ("store-bought") toys;

(c) books, pictures, reading materials. The appropriateness of the item chosen for the infant's play, the method of introducing it to the infant, and continued interaction with the infant during use of the selected material were evaluated in determining the caregiver's competence in the preparation of optimal learning environments appropriate for the child.

Assessments

The final session with each infant and primary caregiver involved two assessments:

1. determination of the infant's developmental level by the use of Wagner's Developmental Tasks (1977a) for the child from birth to twenty-four months developmentally; or the use of Steele's Developmental Tasks (1977a) for the child from twenty-four to forty months developmentally in order to verify and document the child's position in the sample and designation as "normal" or "delayed" (Steele & Wagner, 1977).

2. assessment of parental responses to the TADPOLE PARENT "Q", a questionnaire derived by the investigators (Wagner & Steele, 1977b) from their synthesis of research conclusions in the field of child development regarding behaviors of parent and child that are considered to be those most predictive in producing competent infants who become competent adults.

(PARENT "Q" has a series of short case studies of children at developmental levels from birth to three years with multiple-choice questions. Parents were instructed that the questions might have various answers and that their responses would be regarded as important clues

to how parents are now thinking about exemplary child-rearing. PARENT "Q" is being printed in English and Spanish (Escobedo, 1977) with a videotape available with the Spanish version if the primary caregiver wishes to have PARENT "Q" read before responding to the questions.)

Other Activities

The final session also included:

1. response to a family-information questionnaire;

2. filling out a consent and release form for use of the videotapes;

3. assurance to the family of confidentiality of the data except as specified;

4. giving $10 to each primary caregiver for the family's participation.

Parental Competence

Levels of parental competence were measured by use of two instruments written and partially validated by the processes of this research project.

PARENT "Q", a Knowledge-of-Child-Development Instrument

One of these instruments, PARENT "Q", is a knowledge questionnaire comprised of mini accounts of children having behaviors characteristic of children at developmental levels between birth and three years. The questionnaire attempts to determine its respondents' competence in knowing how ideally, according to current research evidence, to care for children in order to produce competent infants. PARENT "Q" was submitted to twenty educators, community leaders, and one pediatrician

the Lubbock community and representative of the three ethnic groups for review of the responses keyed as "most nearly correct." All twenty PARENT "Q" copies were returned. Several questions were omitted due to lack of unanimity regarding the meaning of the question. Changes in wording were made, especially upon recommendations by the Black and Chicano experts. Scores for each caregiver's responses to PARENT "Q" were calculated as compared to keyed responses.

TADPOLE Observation Scale

In order to compare the levels of parental competence in knowing what to do for the preparation of optimal learning environments for infants from birth to three years of age as demonstrated in response to PARENT "Q", a second instrument was developed. Though a number of objective measures of mother-infant interaction were available from other studies, none seemed to provide an appropriate means for assessing parental competence from videotapes as well as being an effective measurement of "physical surroundings as well as the personality characteristics and teaching styles" of the infant's primary caregiver (Wagner, 1975). The TADPOLE Observation Scale utilized seven subscales purported to measure the following behavioral characteristics of the infant's primary caregiver:

1. tactile stimulation;
2. eliciting of pre-reading skills;
3. healthful caregiving and safety measures;
4. interaction with child;
5. awareness of objects/space/time/causality as meaningful processes for the infant;

6. vocalization/language;

7. behavior management;

8. total interaction with child

The Observation Scale was used as a rating instrument for the behaviors perceived and connoted from the six to eight videotapes of each family. Each of the subscales comprised a portion of a possible score. A total score was derived for parent behaviors observed in the Home Experiences and a separate calculation was made for behaviors shown during Structured Experiences. This paper analyzed the results of the assessment of parental competence in home settings.

Reliability of each of the TADPOLE instruments will be confirmed or denied in additional tasks being performed with them. The credibility of the TADPOLE "Q" is dependent upon the adjusted answers and the expertise that confirmed its keyed responses. The reliability of the TADPOLE Observation Scale has been established only through the consistency of the evaluation provided by one rater who has complied the evaluations for all of the thirty families evaluated by the TADPOLE Observation Scale. That rater determined how evaluations should be made from many hours of discussion and decisions about the levels of ratings based upon the work of other researchers in child development as synthesized by the investigators. Each of the subscales contains from five to ten behaviors to be judged as having been revealed and confirmed repeatedly on the videotapes as typical behavior of the primary caregiver.

The validity and reliability of the TADPOLE Observation Scale is being determined by comparisons of the scores made through its

assessments of the TADPOLE sample families with scores now being collected using the Inventory of Home Stimulation (Caldwell, 1969). Results of those comparisons will be available August, 1977.

During 1977-78, the TADPOLE videotapes will be used for re-rating parental competence to determine rater reliability in use of the Observation Scale and to accept or reject the results of this paper.

Hypotheses

Several null hypotheses were tested:

1. There is no significant difference between parental knowledge of child development as shown by scores on TADPOLE "Q" and parental behaviors in child-rearing as shown by scores on the TADPOLE Observation Scale.

2. There is no significant difference between the TADPOLE "Q" scores of parents of normal children and the TADPOLE "Q" scores of parents of developmentally delayed children.

3. There is no significant difference between the TADPOLE Observation Scale scores of parents of normal children and the TADPOLE Observation Scale scores of parents of developmentally delayed children.

4. There are no significant differences among the TADPOLE "Q" scores of parents in three ethnic groups.

5. There are no significant differences among the TADPOLE Observation Scale scores of parents in three ethnic groups.

6. There is no significant correlation between developmental level of the child and parental TADPOLE "Q" scores.

7. There is no significant correlation between developmental

level of the child and parental TADPOLE Observation Scale scores.

Results

Hypothesis #1 - To Test Difference between Parental TADPOLE "Q" Scores and TADPOLE Home Observation Scale Scores.

TADPOLE parents appear to have significantly higher competence in their understanding of child-rearing at the knowledge level than they demonstrate by their behaviors in handling their children in their home situations--as measured by the TADPOLE instruments. Comparison of the difference between parental mean scores for the TADPOLE instruments--measuring parental knowledge of child-rearing, TADPOLE "Q", and evaluating parental behaviors as shown by child-rearing scenes in their homes is shown in Table 1.

Table 1

	TADPOLE "Q"	TADPOLE OBS.
30 Parents		
Mean	64.2044	53.8667
Standard deviation	18.545	16.225
Standard error	3.386	2.984

Differences = 10.388

t = 2.36

df = 29

p = 0.025

Hypotheses #1 was rejected at the .05 level of probability.

Hypothesis #2 - To Test Difference between Knowledge Scores of Parents of Children Assessed as Functioning at a Normal Level of Development and of Children Functioning at a Delayed Level.

Illustrated in Figure A, by comparing graphically the parental knowledge scores, represented by TADPOLE "Q" virtually no difference between scores of parents of normal and parents of delayed children was revealed. Parents of normal children scored at a slightly lower level on the knowledge instrument than did parents of delayed children.

A one-way analysis of variance was used to compare the apparent lack of difference as shown in Table 2.

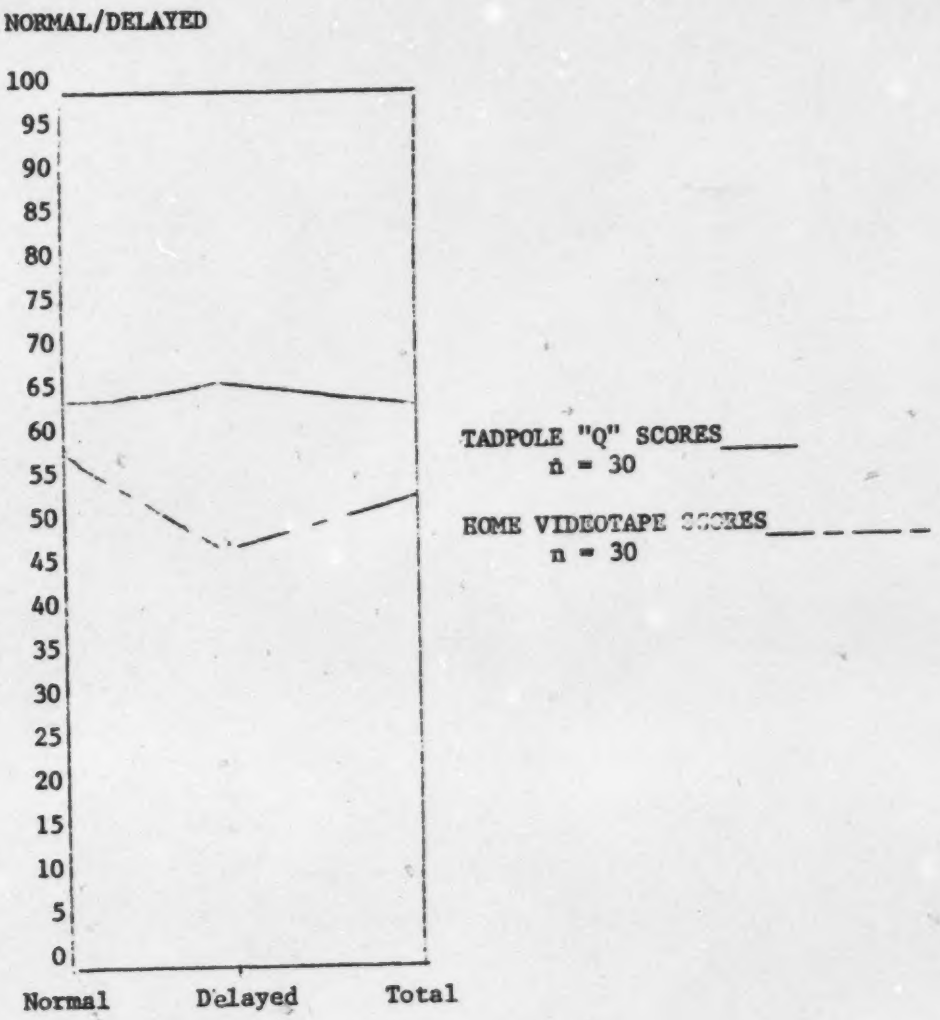
Table 2 - Difference between TADPOLE "Q" Scores of Parents with Normal and Delayed Children

N = 30 parents

Source	df	Sum of Squares	Mean Squares	F ratio	F prob.
Between groups	1	0.0	0.0	0.0	0.305 (NS)
Within groups	28	60.00	2.1429		
Total	29	60.00			

Hypothesis #2 was not rejected.

Figure A


NORMAL/DELAYED
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Normal
Delayed
Total
TADPOLE "Q" SCORES
n = 30
HOME VIDEOTAPE SCORES
n = 30

Hypothesis #3 - To Test Difference between Competence Demonstrated in Behaviors in Home Situations between Parents of Normal and Delayed Children.

In graphic form, Figure A, the Home Observation Videotape scores showed the parents of the normal children scoring at a somewhat higher level than parents of delayed children. One exception occurred as parents of delayed children scored higher on the Tactile Stimulation subscale.

An explanation of these comparisons may be derived from scanning the sample. The children identified as delayed within this sample included both the biological, medically identified syndromes, and the milder forms of slowed development possibly related to environmental factors. Several parents of the biologically delayed group evidenced signs of stress and discouragement related to the child's condition. Other parents of children exhibiting biologically caused delay seemed highly motivated to compensate for the child's handicaps.

One-way analysis of variance compared the difference between demonstration of competence behaviorally in home settings of parents of normal children and parents of developmentally delayed children. Although significant difference at the .05 level did not appear, differences did approach significance as shown in Table 3.

Table 3 - Difference between Competence of Parents in Home Settings of Normal and Delayed Children

N = 30 parents

Source	df	Sum of Squares	Mean Squares	F ratio	F prob.
Between groups	1	580.8125	580.8125	2.303	0.137
Within groups	28	7062.6875	252.2388		
Total	29	7643.5000			

Hypothesis #4 - To Test for Differences Among Ethnic Group Scores using TADPOLE "Q", Parental Knowledge Questionnaire.

Comparison of the total scores of TADPOLE "Q" by parents of the three ethnic groups showed that the Anglo group scored somewhat higher. This result may be partially explained by the fact that much of the research upon which the TADPOLE "Q" was based utilized Caucasians judged to be middle-SES. The Black and Chicano groups were placed to that degree at a disadvantage. Levels of scores for the three ethnic groups are illustrated in Figure B.

To test for the significance of the differences shown graphically, a one-way analysis of variance was applied to the scores obtained from the three ethnic groups. The results are compiled in Table 4.

Table 4 - Difference Among Parental TADPOLE "Q" Scores by Ethnic Group

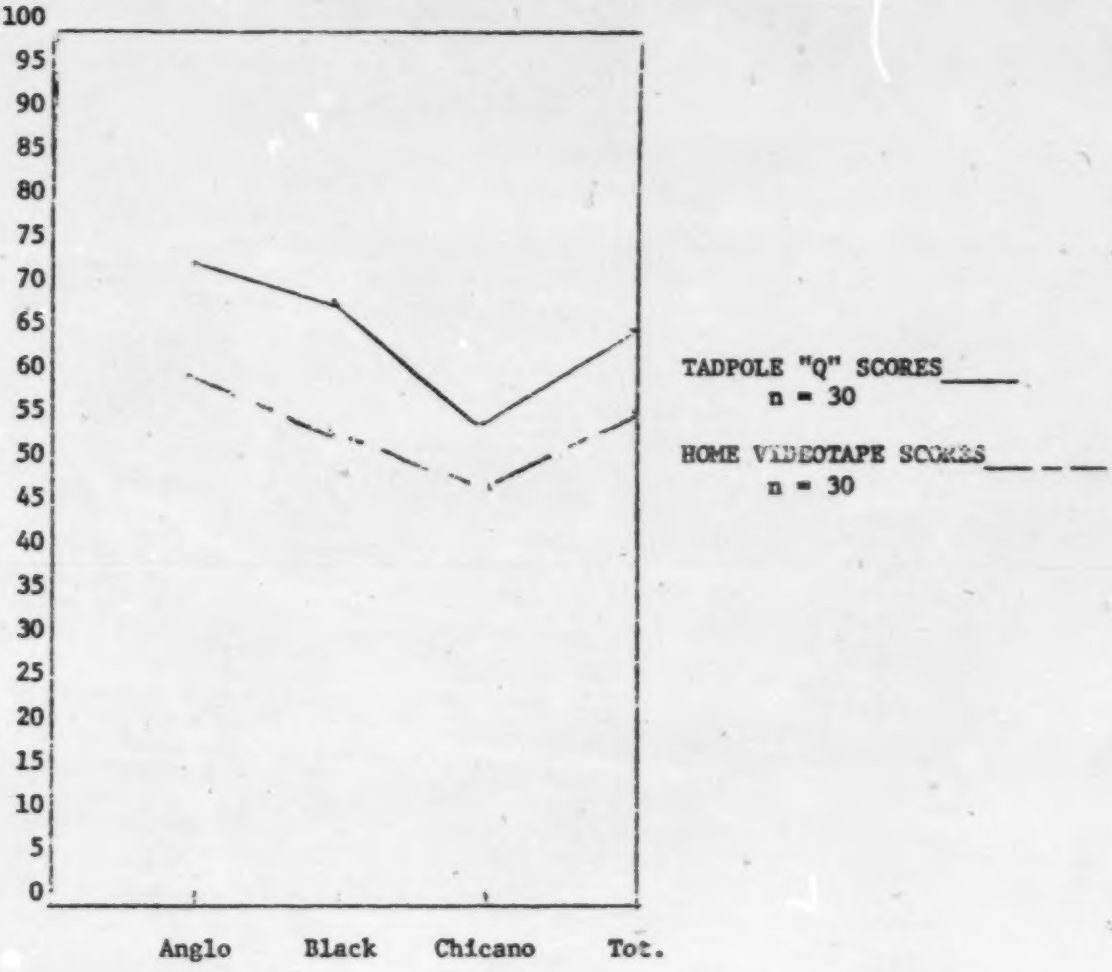
30 Parents

Source	df	Sum of Squares	Mean Squaees	F ratio	F Prob.
Between groups	2	0.0	0.0	0.0	0.019
Within groups	27	60.00	2.2222		
Total	29	60.00			

Hypothesis #4 was rejected at the .05 level of probability.

Figure B

SCORES BY ETHNIC GROUPS



Hypothesis #5 - To test for Differences Among Behaviors of Parents by Ethnic Group as Measured by the TADPOLE Home Observation Scale

Comparison of the total scores of parental behaviors evaluated by the TADPOLE Home Observation Scale according to ethnic group revealed that the Anglo group scored at a higher level. Again this result may be explained to some degree by the fact that the research from which the Home Observation Scale was compiled often based its conclusions upon samples of Anglo families and homes recognized as middle socio-economic level settings, placing the Black and Chicano situations at a disadvantage in that regard.

To determine the significance of the apparent differences, one-way analysis of variance was employed using the scores assessed by the TADPOLE Observation Scale of the parental behaviors displayed in the home videotapings. The results are shown in Table 5.

Table 5 - Difference Among Parental Scores on the Observation Scale by Ethnic Group

N = 30 parents

Source	df	Sum of Squares	Mean Squares	F ratio	F Prob.
Between groups	2	442.875	221.438	0.830	0.450
Within groups	27	7200.625	266.69		
Total	29	7643.5			

Hypothesis #5 was not rejected. In fact, there does not appear to be any degree of difference among the Home Observation Scale scores of the three ethnic groups.

Hypothesis #6 - To Test for Correlations between Children's Developmental Level and Their Parents' TADPOLE "Q" Scores.

The investigators questioned whether or not there would be significant correlation between the knowledge of parents as reflected in their scores on the TADPOLE "Q" instrument and the developmental ages of their children. It was suspected that the parents who had experienced the rearing of the child to the more advanced developmental levels would score at higher levels than those whose children were at the younger stages of development. However, a Pearson "r" correlation between children's developmental levels and parental "Q" scores was computed as 0.0529, showing very little correlation between these two variables. Hypothesis #6 was not rejected.

Hypothesis #7 - To Test for Correlations between Developmental Level and Behavioral Subtest Scores by Parents on the Home Observation Scale

Total behavioral scores by parents on the TADPOLE Observation Scale did not reveal significant correlation with the developmental levels of their children. However, scores by parents in behaviors videotaped in home settings on three of the subscales of the Home Observation Scale were found to be significantly related to the developmental levels of their children. Rather predictably, perhaps, parents whose children were at the upper developmental levels (equivalent to third year developmental age) scored significantly higher in their behavioral competence in the areas of cognitive skills, the "Object/Space/Causality/Time" subtest, "Pre-Reading," and "Vocalization". The Pearson "r" correlations between the children's developmental levels

and their parents' Home Observation Scale scores on these three subscales are shown in Table 6.

Table 6 - Correlations between Developmental Level and Behavioral Subtest Scores by Parents on the Home Observation Scale

	Object/Space/ Causality/Time	Pre-Reading	Vocalization
Correlation with Developmental Levels	0.3118	0.3829	0.3654
Level of Significance	0.047	0.018	0.024

Hypothesis #7 was not rejected for four of the subscales of the TADPOLE Home Observation Scale. Hypothesis #7 was rejected for three subscales of the TADPOLE Home Observation Scale--cognitive skills: Object/Space/Causality/Time, Pre-reading, and Vocalization, at the .05 level of probability.

Discussion

Several conclusions are possible from the compilation of data, test results, and statistical analysis employed in this study:

1. Parents appear to be more knowledgeable about competent techniques for preparing optimal learning environments for their children than they are in actually carrying out the setting up of such situations. The parental knowledge, represented by the TADPOLE "Q" scores, showed higher total scores for TADPOLE parents than the total scores represented by the TADPOLE Observation Scale scores. This result implies that parents know more than they demonstrate, an important understanding for persons developing programs for parents. It would seem that such programs must become models for changing behaviors--not paper and pencil "facts."

2. Although the literature suggested that parents of developmentally delayed children behave in very different respects from those having normal children, the study found that parents of developmentally delayed children did not reflect significantly different knowledge or behavior from those whose children were normal. They did score at a slightly higher level than parents of normal children in their knowledge of competent child care, but their behaviors in caring for their children were evaluated as somewhat lower than those of parents with normal children.

3. A number of explanations could be offered for the finding that on TADPOLE "Q" significant difference was found among the scores of parents represented by the three ethnic groups. Differences among parental scores were evident on the Home Observation Scale but collectively were below the level of significance. The researchers are continuing further analysis of the data in order to determine where the specific areas of competence and need are to be found among these groups so that programs can be designed for meeting these parental deficiencies but with attention to the cultural patterns and values of each ethnic group.

4. The lack of correlation between children's developmental level and their parents' total scores on the knowledge instrument in all probability indicates that, contrary to what one might surmise, just experiencing the act of "parenting" does not necessarily illustrate appropriate and competent child rearing as the process matures. Adequate training in "how to parent" is continuously needed if one is to contribute to the encouragement of the potential of the child.

5. Results showing parental skills significantly correlated to their children's developmental levels in the areas of the more cognitively related activities may indicate that parents realize the need for such environments as the child begins to acquire language and to solve simple problems. Since attention to these capacities of the child might profitably be begun well before eighteen to thirty-six months of age, parenting programs should include components that deal with the building of awareness and eventually of specific activities that can be used by the parent with the very young infant in kinds of vocalizing, use of the object experimentally, and preparing the child for reading experiences.

Lack of correlation between children's developmental levels and their parents' scores on the other four subscales does not necessarily mean that these scores are consistently higher at the younger developmental levels, but other nuisance variables such as varied SES, unequal number of siblings and persons in the homes confound the results and, therefore, the conclusions that might be drawn from this statistic.

Directions for Future Study

While hypotheses were not tested regarding the scores of the seven subscales of the Home Observation Scale by the parents having normal or developmentally delayed children and by parents according to ethnic groups, graphic analysis of subscale data reveals indicators that may prove to be significant. In addition, there appear to be unique patterns of functioning for each ethnic group.

For example, Figure C illustrates that parents of children identified as normal although scoring consistently higher on the Home

Observation Scale showed largely the same pattern of parenting, with one exception. Parents of the delayed children exhibited a higher level of competence in the use of tactile stimulation.

Secondly, Figure D suggests that the question might be posed, "Would a future study indicate that certain parental competencies might prove to be more related to child competencies than others?"

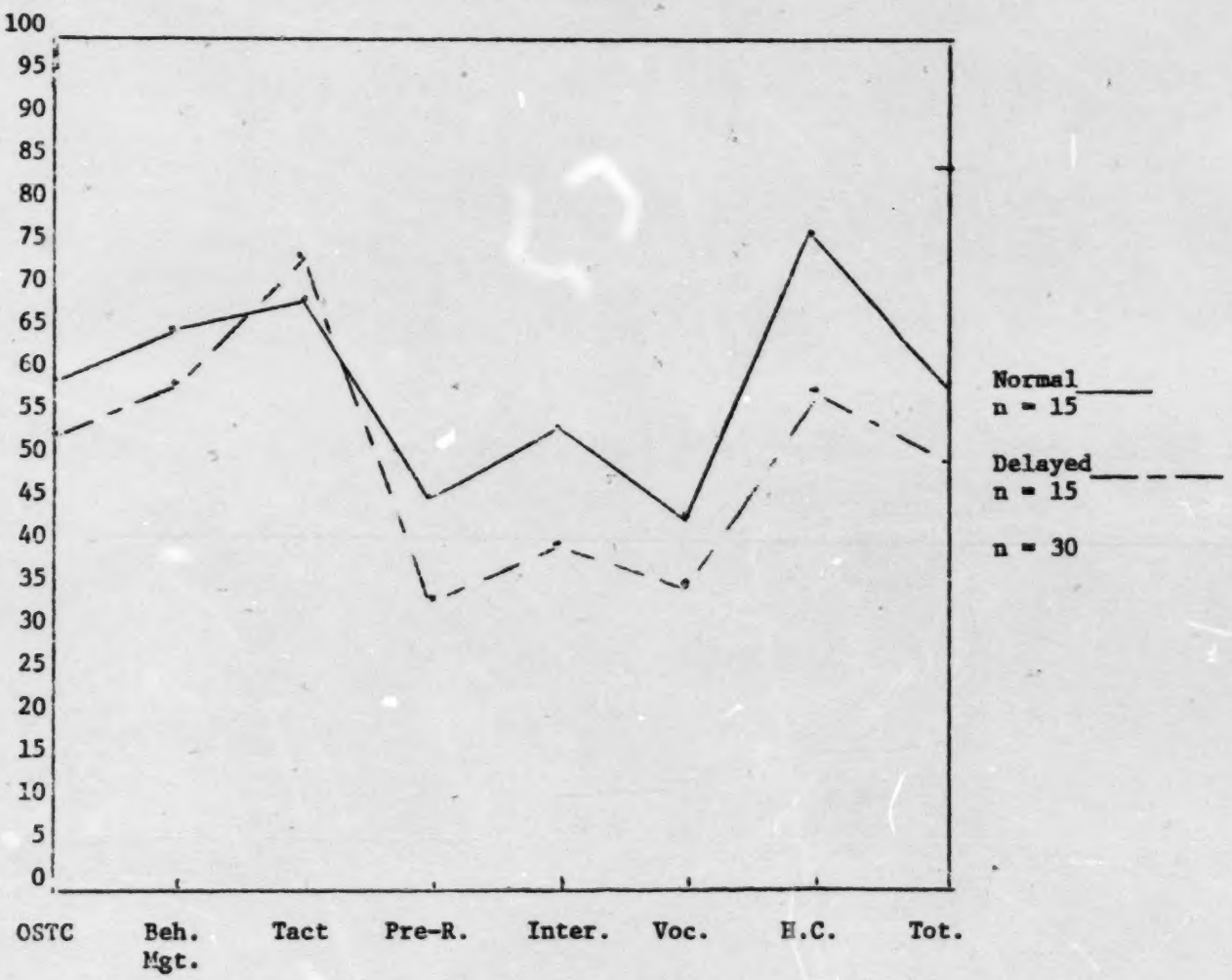
Conclusion

The Tech Assessment and Development for the Preparation of Optimal Learning Environments (TADPOLE) Project convinced the investigators that a wealth of understanding of the ecology of the child can be derived from a study of the infant in natural surroundings, especially home settings. Recognition that the parent displays more knowledge than competent behavior confirms the need for "action training" that involves the parent in finding ways to promote the learnings of the infant in daily situations. Videotapes in home settings can include exemplary models for perceiving how other persons of one's own ethnic group and station in life handle everyday situations and problems. Time consuming? An emphatic "Yes!" Worth it? We think so, and are continuing to evaluate the effort in terms of human need.

FIGURE C

NORMAL/DELAYED

HOME VIDEOTAPE SCORES BY PERCENTAGE*

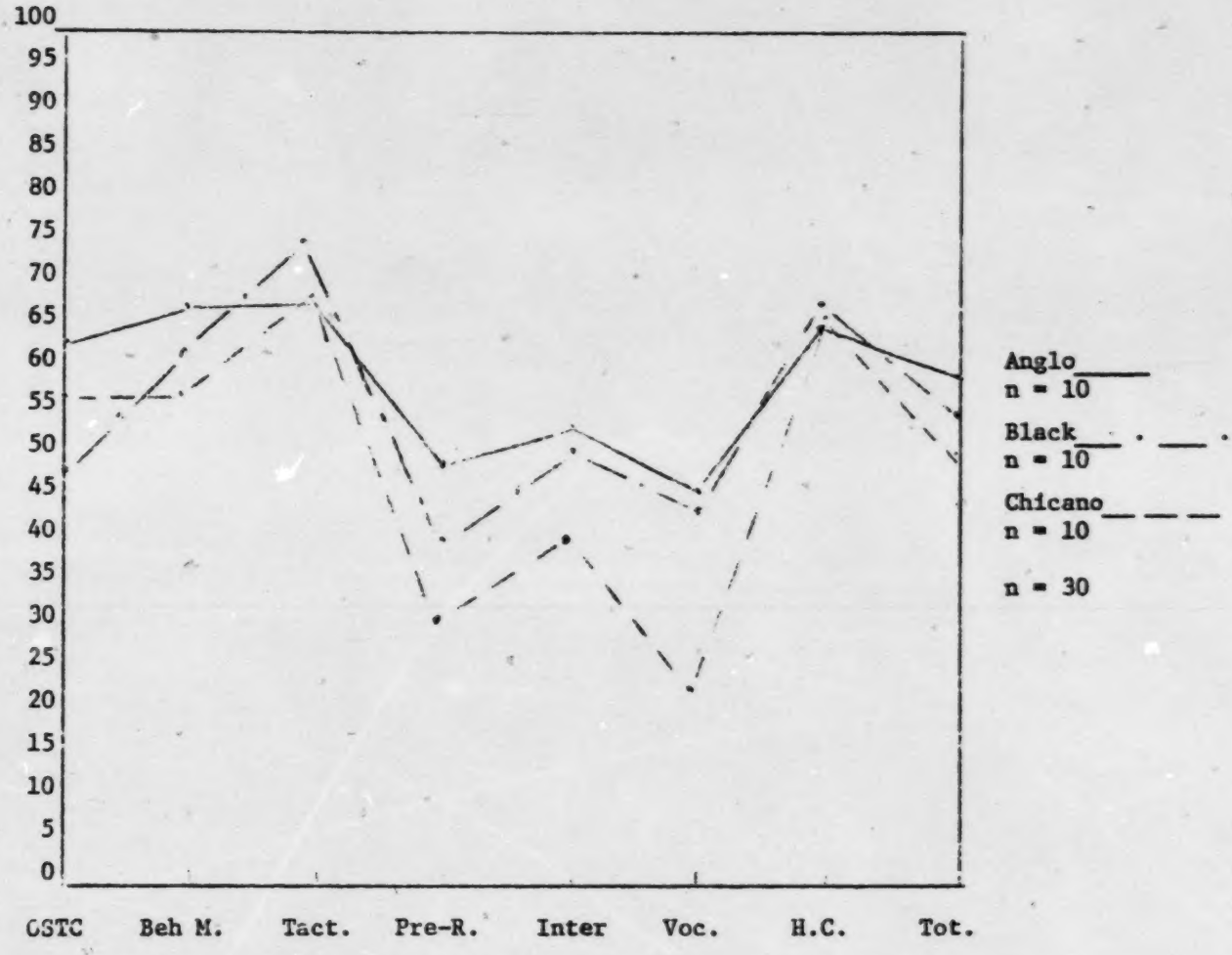


*Raw Scores by Points Possible

Figure D

ETHNIC GROUPS

HOME VIDEOTAPE SCOEES BY PERCENTAGE*



*Raw Scores by Points Possible

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